

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) ~~Membrane~~ A membrane electrochemical generator (1, 100, 200) ~~fed with gaseous reactants and,~~ comprising:

a multiplicity of reaction cells (2, 201),

each said reaction cell having an anodic chamber (9) and a cathodic chamber (10) separated by a proton exchange membrane (4, 204) wherein gaseous reactants react,

each said reaction cell is [[being]] delimited by a pair of conductive bipolar plates (3, 203) ~~among which is comprised a proton exchange membrane (4, 204), and~~

wherein said conductive bipolar plates (3, 203) ~~comprise~~ have a multiplicity of fluid injection calibrated holes (20, 230) for the injection of a calibrated flow of a cooling fluid ~~inside into~~ said reaction ~~[[cells]]~~ cell (2, 201), and

said anodic chamber (1) and said cathodic chamber (10) each has an electrically conductive reticulated element (7, 206).

2. (Currently Amended) A generator of claim 1, ~~wherein each of said reaction cells (2, 201) is formed by an anodic chamber (9) and a cathodic chamber (10) separated by said membrane (4, 204),~~

~~said anodic chamber (9) and said cathodic chamber (10) each comprising an electrically conductive reticulated element (7, 206)~~

wherein ~~at whose interior~~ said calibrated flow of said cooling fluid partially evaporated inside the reaction cell, ~~simultaneously providing for the humidification of~~ humidifying said gaseous reactants inside the reaction cell and ~~for the thermal management removing heat generated in the reaction from~~ said membrane electrochemical generator (1, 100, 200).

3. (Currently Amended) A generator of claim 1, wherein said fluid injection calibrated holes (20, 230) are mutually aligned and placed in correspondence of feed openings (12, 13, 208a<sub>1</sub>, 208a<sub>2</sub>) for feeding said gaseous reactants<sub>1</sub> and of side openings (16, 209) for feeding said cooling fluid (12, 13, 208a<sub>1</sub>, 208a<sub>2</sub>)<sub>1</sub>

wherein and said side openings (16, 209) ~~being obtained~~ are in a perimetrical portion (11, 208) of said conductive bipolar plates (3, 203).

4. (Currently Amended) A generator of claim 1, wherein said fluid injection calibrated holes (20, 230) have the same diameter, said diameter is between 0.2 mm to 1 mm ~~comprised between 0.2 mm/1 mm~~.

5. (Currently Amended) A generator of claim 1, wherein said conductive bipolar plates (3) are interposed between ~~a pair of an sealing gaskets (8a, 8b)~~ of an anodic sealing gasket (8a) and a cathodic sealing gasket (8b) from two adjacent reaction cells (2),

said sealing gaskets (8a, 8b) comprise:

~~each realizing a seat for a respective~~ a hollow center portion wherein an  
electrically conductive reticulated element (7) resides, ~~and comprising:~~  
~~respective~~ feed openings (8a<sub>1</sub>, 8a<sub>2</sub>, 8b<sub>1</sub>, 8b<sub>2</sub>) for the passage of said gaseous  
reactants;  
~~respective~~ side openings (8a<sub>5</sub>, 8b<sub>5</sub>) for the passage of said cooling fluid; and  
~~respective~~ distribution channels (21a, 23a) to fluidly connect said ~~respective~~ feed  
openings (8a<sub>1</sub>, 8a<sub>2</sub>, 8b<sub>1</sub>, 8b<sub>2</sub>) to said ~~respective~~ electrically ~~conducting~~ conductive  
reticulated element (7).

6. (Currently Amended) A generator of clam 5, wherein at least one of said  
sealing gaskets (8a, 8b) comprises ~~respective~~ fluid collection channels (22) connected  
to said ~~respective~~ side openings (8a<sub>5</sub>, 8b<sub>5</sub>),

said fluid collection channels (22) ~~[[being]]~~ are interposed between said  
~~respective~~ feed openings (8a<sub>1</sub>, 8a<sub>2</sub>, 8b<sub>1</sub>, 8b<sub>2</sub>) and said ~~respective~~ distribution channels  
(21a, 23a) ~~and being suited to collect said cooling fluid.~~

7. (Currently Amended) A generator of ~~[[clam]]~~ claim 5, wherein at least one of  
said sealing gaskets (8a, 8b) comprises ~~respective~~ fluid collection channels (22)  
connected to said ~~respective~~ side openings (8a<sub>5</sub>, 8b<sub>5</sub>) and to said ~~respective~~ distribution  
channels (21a, 23a),

said ~~respective~~ fluid collection channels (22) ~~being interposed~~ are located  
between said ~~respective~~ feed openings (8a<sub>1</sub>, 8a<sub>2</sub>, 8b<sub>1</sub>, 8b<sub>2</sub>) and said ~~respective~~  
distribution channels (21a, 23a) ~~and being suited to collect said cooling fluid.~~

8. (Original) A generator of claim 6, wherein in a filter-press configuration said fluid collection channels (22) present on at least one of the sealing gaskets (8a, 8b) are superposed to said fluid injection calibrated holes (20) and that each of said fluid injection calibrated holes (20) is in correspondence of a distribution channel (21a, 23a) obtained on the other sealing gasket (8a, 8b).

9. (Currently Amended) A generator of claim 1, ~~wherein it comprises~~  
comprising a multiplicity of additional cooling cells (101), each of the additional cooling  
cells (101) being interposed between ~~a pair of two~~ reaction cells (2), ~~realizing a seat for~~  
~~a respective electrically conductive reticulated element (7) and comprising a perimetrical~~  
~~portion (102a) in which are obtained:-~~

said cooling cell further comprises:

a perimetrical portion (102a) having a central hollow portion (102b), side  
openings (104) for the passage of said cooling fluid[[:]], at least one fluid collection  
channel (106) connected to said side openings (104) ~~and suited to collect said cooling~~  
~~fluid;~~ feed openings (103a<sub>1</sub>, 103a<sub>2</sub>) for the passage of said gaseous reactants[[:]], and  
discharge openings (103b<sub>1</sub>, 103b<sub>2</sub>) for discharging the reaction products and residual  
reactants[[:]]; and

an electrically conductive reticulated element residing in the central hollow  
portion (102b).

10. (Currently Amended) A generator of claim 9, wherein said fluid collection channel (106) is ~~placed below~~ located between said feed openings (103a<sub>1</sub>, 103a<sub>2</sub>) and said hollow central portion (102b).

11. (Currently Amended) A generator of claim 9, wherein[[,]] in a filter-press configuration[[,]] said fluid collection channel (106) is superposed to said fluid injection calibrated holes (20) of said conductive bipolar plates (3).

12. (Currently Amended) A generator of claim 9, ~~wherein said fluid collection channel (106) is formed by a first and a second side portion (107, 108) placed above said discharge openings (103b<sub>1</sub>, 103b<sub>2</sub>).~~

wherein a side channel 107 and/or 108 fluidly connect the side opening (104) with the hollow central portion (102a).

13. (Currently Amended) A generator of claim 12, wherein said cooling fluid, ~~prior to reaching said fluid injection holes (20), crosses the [[whole]] surface of said respective electrically conductive reticulated element (7)~~ traverses the cooling cell prior to crossing said fluid injection holes (20) into the adjacent reaction cell, pre-heating counter-currently or ~~currently~~ concurrently with respect to at least one gaseous flow entering said reaction cells (2).

14. (Currently Amended) A generator of claim 1, wherein said conductive bipolar plates (203) comprise a multiplicity of first calibrated holes (213a) for the

passage of said gaseous reactants and a multiplicity of second calibrated holes (213b) for the discharge of reaction products and of optional residual reactants,

and that said multiplicity of fluid injection calibrated holes (230) are placed in correspondence of said multiplicity of first calibrated holes (213a).

15. (Currently Amended) A generator of claim 14, wherein said first calibrated holes (213a) are mutually aligned and placed in correspondence of said feed openings (208a<sub>1</sub>, 208a<sub>2</sub>) of said conductive bipolar plates (203), and that said second calibrated holes (213b) are mutually aligned and placed in correspondence of discharge openings (208b<sub>1</sub>, 208b<sub>2</sub>) ~~obtained on~~ said perimetrical portion (208) of said conductive bipolar plates (203).

16. (Currently Amended) A generator of claim 14, wherein said reaction cells (201) comprise a sealing gasket (207) covering only one face of said perimetrical portion (208) of said conductive bipolar plates (203), said sealing gasket (207) ~~realizing a seat for a respective~~ having a central hollow portion wherein an electrically conductive reticulated element (206) resides.

17. (Currently Amended) A generator of claim 14, ~~wherein it comprises~~ comprising:

a multiplicity of ~~additional~~ cooling cells (202), each of the ~~additional~~ cooling cells (202) being interposed between ~~a pair of two~~ reaction cells (201) and comprising a rigid perimetrical portion (202a) and a hollow central portion (202b), said rigid perimetrical

portion (202a) ~~acting as separating surface for~~ separates said gaseous reactants and from said hollow central portion (202b) ~~realizing a seat for a respective~~ an electrically conductive reticulated element (206) resides.

18. (Currently Amended) A generator of claim 17, wherein said rigid perimetrical portion (202a) ~~is provided with~~ has feed openings (214a<sub>1</sub>, 214a<sub>2</sub>) for feeding said gaseous reactants, ~~[[of]]~~ discharge openings (214b<sub>1</sub>, 214b<sub>2</sub>) for discharging the reaction products and the residual reactants, and ~~[[of]]~~ side openings (215) for the passage of said cooling fluid.

19. (Currently Amended) A generator of claim 17, wherein said rigid perimetrical portion (202a) is covered on each face by a gasket (217), said gasket (217) defining on each face of said rigid perimetrical portion (202a)

~~a zone of collection of~~ for collecting the gaseous reactants (218a) fluidly connects with said feed openings (214a<sub>1</sub>, 214a<sub>2</sub>) of said rigid perimetrical portion (202a) through a feed channel (219), and

~~a zone of collection of~~ for collecting the reaction products and ~~[[of]]~~ the residual reactants (218b) ~~placed in correspondence of~~ fluidly connects with said discharge openings (214b<sub>1</sub>, 214b<sub>2</sub>) of said rigid perimetrical portion (202a) through a discharge channel (220), a feed channel (219) to connect one of said feed openings (214a<sub>1</sub>, 214a<sub>2</sub>) to said zone of collection of the gaseous reactants (218a), a discharge channel (220) to connect said zone of collection of the reaction products and of the residual reactants (218b) to one of said discharge openings (214b<sub>1</sub>, 214b<sub>2</sub>).

20. (Currently Amended) A generator of claim 19 wherein said gasket ~~(117)~~ (217) seals said zone ~~of collection of~~ for collecting the gaseous reactants (218a) and said zone ~~of collection of~~ for collecting the reaction products and ~~[[of]]~~ the residual reactants (218b) so as to hinder the passage of said gaseous reactants and of said reaction products and ~~optional~~ optionally residual reactants within said ~~additional~~ cooling cell (202).

21. (Currently Amended) A generator of claim 19, wherein in a filter-press configuration said zone ~~of collection of~~ for collecting the gaseous reactants (218a) is superposed to said first calibrated holes (213a) and said zone ~~of collection of~~ for collecting the reaction products and ~~[[of]]~~ the residual reactants (218b) is superposed to said second calibrated holes (213b).

22. (Currently Amended) A generator of claim 19, wherein said fluid injection calibrated holes (230) are ~~placed~~ located below said first calibrated holes (213a) and that said gasket (217) defines on each face of said rigid perimetrical portion (202a) a fluid collection channel (221) placed below said feed openings (214a<sub>1</sub>, 214a<sub>2</sub>) of said ~~additional~~ cooling cells (202).

23. (Currently Amended) A generator of claim 19, wherein said fluid injection calibrated holes (230) are ~~interposed~~ located between said feed openings (208a<sub>1</sub>, 208a<sub>2</sub>) of said bipolar plates (203) and said first calibrated holes (113a, 113b)<sub>1</sub> and



that said gasket (217) defines on each face of said rigid perimetrical portion (202a) a fluid collection channel (221) ~~interposed~~ located between said feed openings (214a<sub>1</sub>, 214a<sub>2</sub>) of said ~~additional~~ cooling cell (202) and said zone ~~of collection of~~ for collecting the gaseous reactants (118a).

24. (Currently Amended) A generator of claim 22, wherein in a filter-press configuration said fluid collection channel (221) is superposed to said fluid injection ~~calibrate~~ calibrated holes (230).

25. (Currently Amended) A generator of claim 19, wherein said ~~additional~~ cooling cells (202) comprise a first and a second fluid collection lateral channel (222, 223) connected to said side openings (215) of said ~~additional~~ cooling cells (202) and placed above said discharge openings (214b<sub>1</sub>, 214b<sub>2</sub>) of said ~~additional~~ cooling cells (202)<sub>1</sub> and

that said cooling fluid, prior to reaching said fluid injection holes (230)<sub>1</sub> passes through said first and second fluid collection lateral channels (222, 223) to cross subsequently the whole surface of said ~~respective~~ electrically conductive reticulated element (206)<sub>1</sub> pre-heating counter-currently or concurrently with respect to at least one gaseous flow entering said reaction cells (201).

26. (Currently Amended) A generator of claim 19, wherein said ~~additional~~ cooling cells (202) comprise:

a first and a second fluid collection lateral channel (224, 225) connected to said side openings (215) of said ~~of said additional~~ cooling cells (202) and placed above said discharge openings (214b<sub>1</sub>, 241b<sub>2</sub>) of said additional cells (202);

a third and a fourth fluid collection lateral channel (226, 227) connected to said side openings (215) of said ~~additional~~ cooling cells (202) and placed below said feed openings (214a<sub>1</sub>, 214a<sub>2</sub>) of said ~~additional~~ cooling cells (202);

a fluid collection channel (221) ~~interposed~~ located between said feed openings (214a<sub>1</sub>, 214a<sub>2</sub>) of said ~~additional~~ cooling cells (202) and said zone ~~of collection of for~~ collecting the gaseous reactants (218a) and connected to said side openings (215) of said ~~additional~~ cooling cells (202); ~~and that~~

said cooling fluid, prior to reaching said fluid injection holes (230) enters through said first and second fluid collection lateral channel (224, 225) to subsequently cross the whole surface of said ~~respective~~ electrically conductive reticulated element (206), pre-heating counter-currently or concurrently with respect to at least one gaseous flow entering said reaction cells (201), wherein said cooling fluid subsequently exiting from said third and fourth fluid collection lateral channel (226, 227); and

[[that]] in a filter-press configuration said fluid collection channel (221) is superposed to said fluid injection calibrated holes (230).

27. (Currently Amended) A generator [[o]] of claim 1, wherein said cooling fluid is liquid water.

28. (canceled)